Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1.   (Currently Ameded) A method of seamlessly handing off a mobile node from an old sub-network router to a new sub-network router in an Internet Protocol based wireless access network, comprising:

obtaining a handoff starting time from a lower layer complying with Open Systems Interconnections (OSI) model;

using information from the lower layer of the OSI model to notify the mobile node that a connection with the old sub-network router will be discarded within a predetermined amount of time;

obtaining a new care-of address for the mobile node from the new sub-network router;

sending a request message from the mobile node to a base node via the new sub-network router requesting a new binding;

creating a new care-of address binding in the base node;

issuing, at the same time, two registration reply messages, one from the base node to the mobile node wherein a registration reply message is sent to the new care-of address via the new sub-network router indicating that the new care-of address binding has been created and a deregistration reply message is sent from the base node to the old care-of address via the old sub-network router notifying the mobile node that binding with the old care-of address has been removed; and

utilizing the deregistration reply message to synchronize a transfer of old care-of address data packets stored on the old sub-network router to the mobile node.

the home agent

sends the two registration reply messages (one of them is the DRR)

after receiving the registration request message and by using the DRR as a synchronisation point.

2.   (Original)   The method according to claim 1, wherein the request message is a mobile node registration request message and the reply message is a mobile node registration reply message.

3.   (Previously Presented)   The method according to claim 2, wherein the base node is a home agent and the mobile node is capable of accessing two sub-networks simultaneously, the synchronizing step comprising:

deleting an old care-of address binding from the home agent.

4.   (Previously Presented)   The method according to claim 3, wherein the mobile node does not receive the deregistration reply message before a predetermined time, the synchronizing step further comprising:

sending a binding update message from the mobile node to the old sub-network router;

creating a binding cache entry in the old sub-network router linking the old care-of address to the new care-of address;

issuing a binding acknowledgment message from the old sub-network router to the mobile node via the new sub-network router; and

forwarding old care-of address data packets stored or arriving at the old sub-network router to the new care-of address.

5.   (Previously Presented)   The method according to claim 2, wherein the base node is a home agent and the mobile node is capable of accessing only a single sub-network at a time, the synchronizing step comprising:

sending a binding update message from the mobile node to the old sub-network router;

creating a binding cache entry in the old sub-network router linking the old care-of address to the new care-of address;

issuing a binding acknowledgment message from the old sub-network router to the mobile node via the new sub-network router;

forwarding old care-of address data packets stored or arriving at the old sub-network router to the new care-of address;

deleting an old care-of address binding from the home agent; and

issuing a deregistration reply message from the home agent to the mobile node via the old sub-network router indicating that the old care-of address binding has been deleted.

6.   (Original)   The method according to claim 2, wherein a route optimization function is used, the base node is a home agent, and the mobile node is capable of accessing two sub-networks simultaneously, the synchronizing step comprising:

sending a deregistration binding update message from the mobile node to a correspondent node via the old sub-network router;

deleting an old care-of address binding from the correspondent node;

issuing a deregistration binding acknowledgment message from the correspondent node to the mobile node via the old sub-network router;

sending a binding update message from the home agent to the correspondent node; and

creating a new care-of address binding in the correspondent node.

7.   (Previously Presented)   The method according to claim 6, wherein the mobile node does not receive the deregistration binding acknowledgment message before the old wireless sub-network has deteriorated beyond a certain point, the synchronizing step further comprising:

sending a binding update message from the mobile node to the old sub-network router;

creating a binding cache entry in the old sub-network router linking the old care-of address to the new care-of address;

issuing a binding acknowledgment message from the old sub-network router to the mobile node via the new sub-network router; and

forwarding old care-of address data packets stored or arriving at the old sub-network router to the new care-of address.

8.   (Previously Presented)   The method according to claim 2, wherein a route optimization function is used, the base node is a home agent, and the mobile node is capable of accessing only a single sub-network at a time, the synchronizing step comprising:

sending a binding update message from the mobile node to the old sub-network router;

creating a binding cache entry in the old sub-network router linking the old care-of address to the new care-of address;

issuing a binding acknowledgment message from the old sub-network router to the mobile node via the new sub-network router;

forwarding old care-of address data packets stored or arriving at the old sub-network router to the new care-of address;

sending a binding update message from the home agent to a correspondent node; and

creating a new care-of address binding in the correspondent node.

9.   (Original)   The method according to claim 2, wherein the base node is a gateway foreign agent and the mobile node is capable of accessing two sub-networks simultaneously, the synchronizing step comprising:

deleting an old care-of address binding from the gateway foreign agent; and

issuing a deregistration reply message from the gateway foreign agent to the mobile node via the old sub-network router indicating that the old care-of address binding has been deleted.

10.   (Previously Presented)   The method according to claim 9, wherein the mobile node does not receive the deregistration binding acknowledgment message before a predetermined time, the synchronizing step further comprising:

sending a binding update message from the mobile node to the old sub-network router;

creating a binding cache entry in the old sub-network router linking the old care-of address to the new care-of address;

issuing a binding acknowledgment message from the old sub-network router to the mobile node via the new sub-network router; and

forwarding old care-of address data packets stored or arriving at the old sub-network router to the new care-of address.

11.   (Previously Presented)   The method according to claim 2, wherein the base node is a gateway foreign agent, and the mobile node is capable of accessing only a single sub-network at a time, the synchronizing step comprising:

sending a binding update message from the mobile node to the old sub-network router;

creating a binding cache entry in the old sub-network router linking the old care-of address to the new care-of address;

issuing a binding acknowledgment message from the old sub-network router to the mobile node via the new sub-network router;

forwarding old care-of address data packets stored or arriving at the old sub-network router to the new care-of address;

deleting an old care-of address binding from the gateway foreign agent; and

issuing a deregistration reply message from the gateway foreign agent to the mobile node via the old sub-network router indicating that the old care-of address binding has been deleted.

12.   (Original)   The method according to claim 1, wherein the request message is a binding update message and the reply message is a binding acknowledgment message.

13. (Original)   The method according to claim 12, wherein the base node is a home agent and the mobile node is capable of accessing two sub-networks simultaneously, the synchronizing step comprising issuing:

sending a deregistration binding update message from the mobile node to the home agent via the old sub-network router;

deleting an old care-of address binding from the home agent; and

sending a deregistration reply message from the home agent to the mobile node via the old sub-network router indicating that the old care-of address binding has been deleted.

14. (Previously Presented)   The method according to claim 13, wherein the mobile node does not receive the deregistration reply message before the old wireless sub-network has badly deteriorated beyond a certain point, the synchronizing step further comprising:

sending a binding update message from the mobile node to the old sub-network router;

creating a binding cache entry in the old sub-network router linking the old care-of address to the new care-of address;

issuing a binding acknowledgment message from the old sub-network router to the mobile node via the new sub-network router; and

forwarding old care-of address data packets stored or arriving at the old sub-network router to the new care-of address.

15. (Previously Presented)   The method according to claim 12, wherein the base node is a home agent and the mobile node is capable of accessing only a single sub-network at a time, the synchronizing step comprising:

sending a binding update message from the mobile node to the old sub-network router;

creating a binding cache entry in the old sub-network router linking the old care-of address to the new care-of address;

issuing a binding acknowledgment message from the old sub-network router to the mobile node via the new sub-network router;

forwarding old care-of address data packets stored or arriving at the old sub-network router to the new care-of address;

sending a deregistration binding update message from the mobile node to the home agent via the old sub-network router;

deleting an old care-of address binding from the gateway foreign agent; and

issuing a deregistration reply message from the gateway foreign agent to the mobile node via the old sub-network router indicating that the old care-of address binding has been deleted.

16.   (Original)   The method according to claim 12, wherein a route optimization function is used. the base node is a home agent, and the mobile node is capable of accessing two sub-networks simultaneously, the synchronizing step comprising:

sending a deregistration binding update message from the mobile node to a correspondent node via the old sub-network router;

deleting an old care-of address binding in the correspondent node;

issuing a deregistration binding acknowledgment message from correspondent node to the mobile node via the old sub-network router;

sending a binding update message from the mobile node to the correspondent node via the new sub-network router;

creating a new care-of address binding in the correspondent node; and

issuing a binding acknowledgment message from the correspondent node to the mobile node via the new sub-network router.

17.   (Previously Presented)   The method according to claim 16, wherein the mobile node does not receive the deregistration binding acknowledgment message before the old wireless sub-network has deteriorated beyond a certain point, the synchronizing step further comprising:

sending a binding update message from the mobile node to the old sub-network router;

creating a binding cache entry in the old sub-network router linking the old care-of address to the new care-of address;

issuing a binding acknowledgment message from the old sub-network router to the mobile node via the new sub-network router; and

forwarding old care-of address data packets stored or arriving at the old sub-network router to the new care-of address.

18.   (Previously Presented)   The method according to claim 12, wherein a route optimization function is used, the base node is a home agent, and the mobile node is capable of accessing only a single sub-network at a time, the synchronizing step comprising:

sending a binding update message from the mobile node to the old sub-network router;

creating a binding cache entry in the old sub-network router linking the old care-of address to the new care-of address;

issuing a binding acknowledgment message from the old sub-network router to the mobile node via the new sub-network router;

forwarding old care-of address data packets stored or arriving at the old sub-network router to the new care-of address;

sending a binding update message from the mobile node to the correspondent node via the new sub-network router;

creating a new care-of address binding in the correspondent node; and

issuing a binding acknowledgment message from the correspondent node to the mobile node via the new sub-network router.

19.   (Original)   The method according to claim 12, wherein the base node is a mobility anchor point and the mobile node is capable of accessing two sub-networks simultaneously, the synchronizing step comprising:

sending a deregistration binding update message from the mobile node to the mobility anchor point via the old sub-network router;

deleting an old care-of address binding from the mobility anchor point; and

issuing a deregistration binding acknowledgment message from the mobility anchor point to the mobile node via the old sub-network router.

20.   (Previously Presented)   The method according to claim 19, wherein the mobile node does not receive the deregistration binding acknowledgment before the old wireless sub-network has deteriorated beyond a certain point, the synchronizing step further comprising:

sending a binding update message from the mobile node to the old sub-network router;

creating a binding cache entry in the old sub-network router linking the old care-of address to the new care-of address;

issuing a binding acknowledgment message from the old sub-network router to the mobile node via the new sub-network router; and

forwarding old care-of address data packets stored or arriving at the old sub-network router to the new care-of address.

21.   (Previously Presented)   The method according to claim 12, wherein the base node is a gateway foreign agent, and the mobile node is capable of accessing only a single sub-network at a time, the synchronizing step comprising:

sending a binding update message from the mobile node to the old sub-network router;

creating a binding cache entry in the old sub-network router linking the old care-of address to the new care-of address;

issuing a binding acknowledgment message from the old sub-network router to the mobile node via the new sub-network router;

forwarding old care-of address data packets stored or arriving at the old sub-network router to the new care-of address;

sending a deregistration binding update message from the mobile node to the mobility anchor point via the old sub-network router;

deleting an old care-of address binding from the mobility anchor point; and

issuing a deregistration binding acknowledgment message from the mobility anchor point to the mobile node via the old sub-network router.

22.   (Currently Amended)   An Internet Protocol based wireless access network, comprising:

a lower layer complying with Open Systems Interconnections (OSI) model wherein a handoff starting time is obtained;

a mobile node adapted to obtain a new care-of address from a new sub-network router, and to issue a request message via the new sub-network router requesting a new binding, upon being notified from the lower layer of the OSI model that a connection with an old sub-network router will be discarded within a predetermined amount of time; and

a base node adapted to create the new care-of address binding upon receiving the request message from the mobile node and to issue, at the same time, two registration reply messages being sent to both the old sub-network router and the new sub-network router, including:

a registration reply message to the mobile node via the new sub-network router indicating that the new care-of address binding has been created, wherein the base node is adapted to delete an old care-of address binding therefrom upon receiving a deregistration request message and

a deregistration binding acknowledgment message to the mobile node via the old sub-network router indicating that the old care-of address binding has been deleted; wherein the mobile node and the base node are further adapted to utilize the deregistration reply message to synchronize the transfer of old care-of address data packets stored on the old sub-network router from the base node to the mobile node in a synchronized manner.

23.   (Original)   The network according to claim 22, wherein the request message is a mobile node registration request message and the reply message is a mobile node registration reply message.

24.   (Original)   The network according to claim 22, wherein the request message is a binding update message and the reply message is a binding acknowledgment message.

25.   (Original)   The network according to claim 22, wherein a route optimization function is used.

26.   (Original)   The network according to claim 22, wherein the mobile node is capable of accessing two sub-networks simultaneously.

27.   (Original)   The network according to claim 22, wherein the mobile node is capable of accessing only a single sub-network at a time.

28.   (Original)   The network according to claim 22, wherein the base node is a home agent.

29.   (Original)   The network according to claim 22, wherein the base node is a gateway foreign agent.

30.   (Original)   The network according to claim 22, wherein the base node is a mobility anchor point.

31.   (Original)   The network according to claim 22, wherein the base node is further adapted to delete an old care-of address binding and issue a deregistration reply message to the mobile node via the old sub-network router indicating that the old care-of address binding has been deleted.

32.   (Canceled)

33.   (Previously Presented)   The network according to claim 22, wherein the mobile node is further adapted to send a binding update message to the old sub-network router, and the old sub-network router is adapted to create a binding cache entry linking the old care-of address to the new care-of address, issue a binding acknowledgment message to the mobile node via the new sub-network router, and forward old care-of address data packets stored or arriving thereat to the new care-of address.

34.   (Original)   The network according to claim 22, wherein the mobile node is further adapted to send a deregistration binding update message to a correspondent node via the old sub-network router, and the correspondent node is adapted to delete an old care-of address binding therefrom, and issue a deregistration binding acknowledgment message to the mobile node via the old sub-network router.

35.   (Original)   The network according to claim 22, wherein the base node is further adapted to send a binding update message to a correspondent node, and the correspondent node is adapted to create a new care-of address binding therein.

36.   (Currently Amended)   A method of handing off a mobile node from an old sub-network router to a new sub-network router in an Internet Protocol based wireless access network, comprising:
    obtaining a handoff starting time from a lower layer complying with Open Systems Interconnection (OSI) model;
    using information from the lower layer of the OSI model to notify the mobile node that a connection with the old sub-network router will be discarded within a predetermined amount of time;

obtaining a new care-of address for the mobile node from the new sub-network router;

sending a request message from the mobile node to a base node via the new sub-network router requesting a new binding, the base node being predetermined one of a home agent, a gateway foreign agent, and a mobility anchor point;

creating a new care-of address binding in the base node;

issuing, ~~at the same time,~~ two registration reply messages from the base node to the mobile node to both the old sub-network router and the new sub-network router:

a registration reply message via the new sub-network router indicating that the new care-of address binding has been created and

a deregistration reply message via the old sub-network router indicating that the old care-of address binding has been deleted; and

utilizing the deregistration reply message to synchronize a transfer of old care-of address data packets stored on the old sub-network router from the base node to the mobile node.

37. (Original) The method according to claim 36, wherein the request message is a mobile node registration request message and the reply message is a mobile node registration reply message.

38. (Original) The method according to claim 36, wherein the request message is a binding update message and the reply message is a binding acknowledgment message.

39. (Original) The method according to claim 36, wherein a route optimization function is used.

40. (Original) The method according to claim 36, wherein the mobile node is capable of accessing two sub-networks simultaneously.

41.   (Original)   The method according to claim 36, wherein the mobile node is capable of accessing only a single sub-network at a time.

42.   (Previously Presented)   The method according to claim 36, wherein the synchronization step further comprises:

deleting an old care-of address binding from the base node.

43.   (Original)   The method according to claim 36, wherein the synchronization step comprises:

sending a deregistration binding update message from the mobile node to the base node via the old sub-network router;

deleting an old care-of address binding from the base node; and

issuing a deregistration binding acknowledgment message from the base node to the mobile node via the old sub-network router indicating that the old care-of address binding has been deleted.

44.   (Previously Presented)   The method according to claim 36, wherein the synchronization step comprises:

sending a binding update message from the mobile node to the old sub-network router;

creating a binding cache entry in the old sub-network router linking the old care-of address to the new care-of address;

issuing a binding acknowledgment message from the old sub-network router to the mobile node via the new sub-network router; and

forwarding old care-of address data packets stored or arriving at the old sub-network router to the new care-of address.

45.   (Original)   The method according to claim 36, wherein the synchronization step comprises:

sending a deregistration binding update message from the mobile node to a correspondent node via the old sub-network router;

deleting an old care-of address binding from the correspondent node; and

issuing a deregistration binding acknowledgment message from the correspondent node to the mobile node via the old sub-network router.

46. (Original) The method according to claim 36, wherein the synchronization step comprises:

sending a binding update message from the base node to a correspondent node; and

creating a new care-of address binding in the correspondent node.